



Particulate Matter (PM) Emission Calculations Part 2

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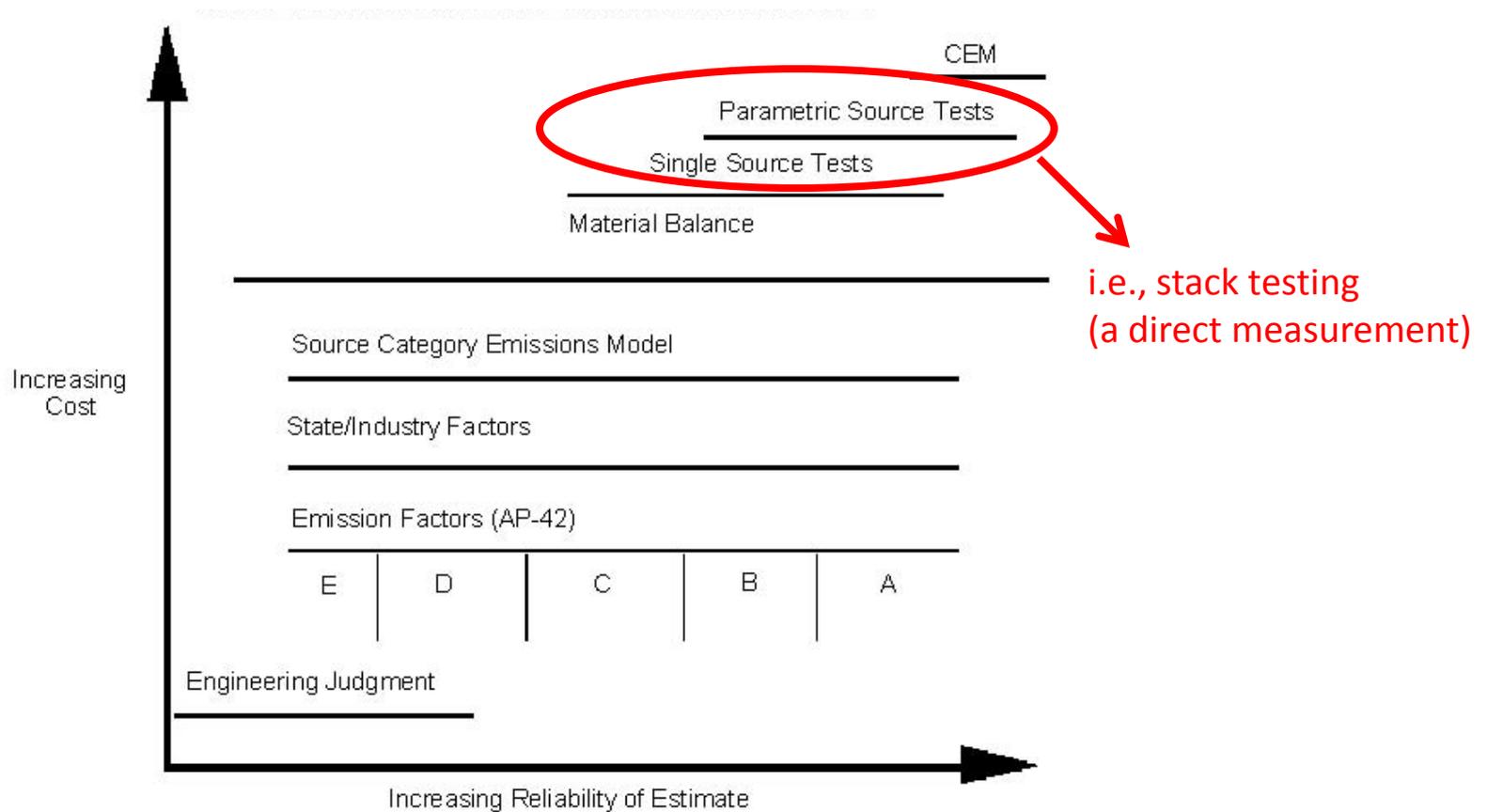


How Do I Calculate My Emissions?

- Facilities should use the “best available” information to estimate emissions.
- Various approaches to emission estimation:
 - Direct measurement
 - Mass balance
 - Emission factors



Approaches to Emission Estimation



Source: [Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition, Volume I](#)



PM Sources With Stack Testing Requirements

PERFORMANCE TESTING REQUIREMENTS

The facility shall, at its own expense and using the most recent versions of the test methods contained in 40 CFR Part 60 (Appendix A) or Part 63 or tests approved by the Administrator of the USEPA or MCAQ, demonstrate compliance with the appropriate regulatory requirement as follows:

Emission Source Description and ID	Demonstrate Compliance with ...	Scheduled Testing Frequency
ES-1, Hot Mix Asphalt Plant	MCAPCO Regulation 2.0501 & 2.0506	- Initial Test: within 180 days after: initial startup of the emission source or following any modification to the emission source or control device - Additional Tests: upon written request by MCAQ.
	40 CFR 60.92	Refer to 40 CFR 60.8

All performance tests shall be made by, or under the direction of, a person qualified by training and/or experience in the field of air pollution testing. MCAQ shall be notified at least 30 days in advance of the proposed test so that it may have a representative present to observe the test at its option. The notification shall include a detailed description of the test procedures so that MCAQ may review and approve them. The final test results shall be submitted to MCAQ for review within 60 calendar days after completion of on-site testing. The performance test(s) specified in this condition do not preclude MCAQ from requesting performance testing for other emission sources or for other purposes as defined in **MCAPCO Regulation 1.5104 - "General Duties and Powers of the Director, With the Approval of the Board"**, and referenced in General Condition and Limitation No. G-6 of this Permit.



What to look for on your stack test report?

2.0 RESULTS

This section presents a summary of the results detailed sampling results and example calculations for the test program can be found in Appendix A. Field data sheets and sample recovery documentation are presented in Appendix B.

2.1 Summary of Results

The table below represents a synopsis of the particulate matter sampling and visible emission observations conducted at the HMA Baghouse Outlet.

Table 2 – Summary of Results

HMA Baghouse Outlet				
Pollutants	Emission Rate, lbs/hr	Emission Limit, lbs/hr	Emission Rate, gr/dscf*	Emission Limit, gr/dscf*
Filterable Particulate Matter	0.61	57.3	0.0039	0.04
Condensable Particulate Matter	0.90		0.0058	
Total Particulate Matter	1.52		0.0097	
Visible Emissions	Run 1	Run 2	Run 3	Emission Limit, % Opacity
Opacity %	0%	0%	0%	20%

* gr/dscf = grains per dry standard cubic foot



What to look for on your stack test report?

2.2 Discussion

██████████ has been issued Air Permit No. ██████████ by the MCAQ for the HMA facility located in Charlotte, North Carolina. The HMA Baghouse Outlet is permitted to discharge filterable particulate matter not in excess of 0.04 gr/dscf. Using the permit equation for the allowable emission rate of particulate matter in pounds per hour ($4.9445 \times P^{0.4376}$ where P is less than 300 tons/hr) and the tested production rate (270 tons per hour) the calculated allowable emission rate is 57.3 pounds per hour. The results from this test program demonstrate that the tested unit is in compliance with those air permit limitations.

Your facility's tested production rate used during the stack test must be used to calculate the site specific emissions.





Unit Conversion

- From the example, the emission rate provided in the stack test report in gr/dscf and lbs/hr.
 - Convert from lbs/hr to lbs/ton for annual emission calculation.
- Emission Rate (lbs/ton) = $\frac{\text{emission rate (lbs/hr)}}{\text{production rate (tons/hr)}}$



Example: Site-Specific Stack Test Rate Unit Conversion

- Tested production rate: 270 tons/hr
- PM (filterable) emission rate = 0.61 lbs/hr =
0.0023 lbs/ton
- PM (condensible) emission rate = 0.90 lbs/hr =
0.0033 lbs/ton



Example: Spreadsheet Input Using Stack Test Results

A	B	C	D	E	F	G
Date:	4/7/2015	Data Year:	2014			
Facility Name:	Mix It Up Asphalt					
Premise Number:	0	Enter information in RED				
Choose Plant Type: (1= batch, 2=drum)	2					
Annual Throughput (TPY):	108,500					
Hourly Throughput (TPH):	300					
Heat Input Capacity (Million Btu/hr)	75					
Fuel Type (1 = Natural Gas, 2 = No. 2 fuel oil, 3 = No.4, 5, & 6 fuel oils)	1					
Actual Fuel Oil Sulfur Content (%): (The Sulfur content of No. 2 Fuel oil is 0.5% by Default)	0.5					
Potential Fuel Oil Sulfur Content (%)	0.5					
Is Waste Oil Fired? (Y/N)	n					
Stack Test Results	PM - filterable	0.0023	lb/ton		Test Date	7/8/2014
	PM - condensable	0.0033	lb/ton			7/8/2014
	CO		lb/ton			
	NOx		lb/ton			
Asphalt Properties						
Asphalt temperature (degrees F):	325					
Volatility loss (%):	-0.5					
Liquid Asphalt Tank Heaters						
Heat Input Capacity (Million Btu/hr)	1.2					
CF of Natural Gas Used	10205825.24	If heater ran on natural gas 8760, CF of Gas Used =				10,205,825.24
Gallons of Fuel Used	0	If heater ran on #2 fuel oil 8760, Gallons of Fuel Used =				74,553.19
Actual %S of Fuel Oil	0.5					
Potential % S of Fuel Oil	0.5					
Gallons of Liquid Asphalt added to storage tank in CY	1049631					





Example: Spreadsheet Output

Actual Emissions for Data Year: 2014

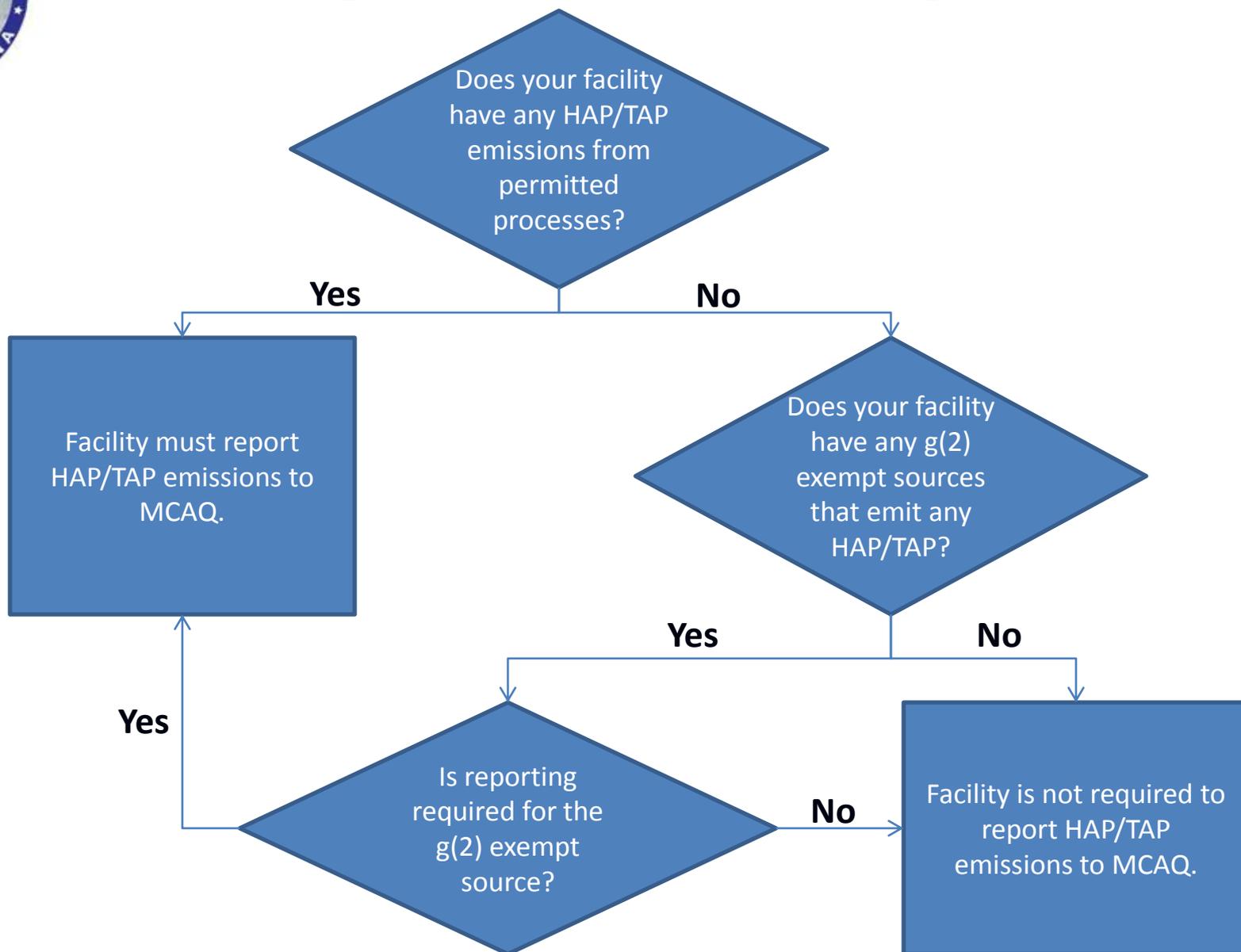
Pollutant	Actual Controlled				Potential Controlled				Potential Uncontrolled			
	Dryer (TpY)	Handling (TpY)	Heaters (TpY)	Total (TpY)	Dryer (TpY)	Handling (TpY)	Heaters (TpY)	Total (TpY)	Dryer (TpY)	Handling (TpY)	Heaters (TpY)	Total (TpY)
TSP	0.3038	0.0601	0.0392	0.4031	7.3584	1.4557	0.1230	8.9371	#####	1.4557	0.1230	#####
PM-10	0.2651		0.0392	0.3043	6.4215		0.0887	6.5102	#####		0.0887	#####
PM 2.5	0.1903		0.0392	0.2294	4.6082		0.0794	4.6876	#####		0.0794	#####
Nitrogen Oxides	1.4105		0.5153	1.9258	34.1640		0.7455	34.9095	34.1640		0.7455	34.9095
Carbon Monoxide	7.0525	0.1372	0.4328	7.6226	170.8200	3.3234	0.4328	174.5762	170.8200	3.3234	0.4328	174.5762
Sulfur Dioxide	0.0040		0.0031	0.0070	0.0957		1.3233	1.4190	0.0957		1.3233	1.4190
Volatile Organic Compounds	1.7360	0.8732	0.0283	2.6376	42.0480	21.1503	0.0283	63.2266	42.0480	21.1503	0.0283	63.2266

Pollutant	Actual Controlled				Potential Controlled				Potential Uncontrolled			
	Dryer (TPY)	Handling (TPY)	Heaters (TPY)	Total (TPY)	Dryer (TpY)	Handling (TpY)	Heaters (TpY)	Total (TpY)	Dryer (TpY)	Handling (TpY)	Heaters (TpY)	Total (TpY)
Acetaldehyde (TH)	0.0000			0.0000	0.0000			0.0000	0.0000			0.0000
Acrolein (TH)	0.0000			0.0000	0.0000			0.0000	0.0000			0.0000
Ammonia (T)			0.0025	0.0025			0.0298	0.0298			0.0298	0.0298
Arsenic & Compounds (TH)	0.0000		0.0000	0.0000	0.0007		0.0000	0.0008	0.0007		0.0000	0.0008
Benzene (TH)	0.0212	0.0003	0.0000	0.0215	0.5125	0.0080	0.0000	0.5204	0.5125	0.0080	0.0000	0.5204
Benzo(a)pyrene (T)	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Beryllium & compounds (TH)	0.0000			0.0000	0.0000			0.0000	0.0000			0.0000
Cadmium & compounds (TH)	0.0000		0.0000	0.0000	0.0005		0.0000	0.0005	0.0005		0.0000	0.0005
Carbon disulfide (TH)	0.0000	0.0001		0.0001	0.0000	0.0033		0.0033	0.0000	0.0033		0.0033
Formaldehyde (TH)	0.1682	0.0048	0.0004	0.1733	4.0734	0.1153	0.0023	4.1910	4.0734	0.1153	0.0023	4.1910
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (T)	0.0000			0.0000	0.0000			0.0000	0.0000			0.0000
Hexane, n- (TH)	0.0499	0.0010	0.0093	0.0602	1.2089	0.0242	0.0093	1.2424	1.2089	0.0242	0.0093	1.2424
Hydrogen Sulfide (T)	0.0028	0.0002	0.0006	0.0035	0.0681	0.0038	0.0006	0.0725	0.0681	0.0038	0.0006	0.0725
Manganese & compounds (TH)	0.0004		0.0000	0.0004	0.0101		0.0000	0.0101	0.0101		0.0000	0.0101
Mercury & Compounds (TH)	0.0000			0.0000	0.0003			0.0003	0.0003			0.0003
Methyl chloroform (TH)	0.0026	0.0000		0.0026	0.0631	0.0000		0.0631	0.0631	0.0000		0.0631
Methyl ethyl ketone (T)	0.0000	0.0004		0.0004	0.0000	0.0089		0.0089	0.0000	0.0089		0.0089
Methylene chloride (TH)	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Nickel & Compounds (TH)	0.0034		0.0000	0.0034	0.0828		0.0000	0.0828	0.0828		0.0000	0.0828
Perchloroethylene (tetrachloroethylene) (TH)	0.0000	0.0000		0.0000	0.0000	0.0004		0.0004	0.0000	0.0004		0.0004
Phenol (TH)	0.0000	0.0002		0.0002	0.0000	0.0053		0.0053	0.0000	0.0053		0.0053
Soluble Chromate Compounds, as Chromium (VI) (T)	0.0000			0.0000	0.0006			0.0006	0.0006			0.0006
Styrene (TH)	0.0000	0.0001		0.0001	0.0000	0.0013		0.0013	0.0000	0.0013		0.0013
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (TH)	0.0000			0.0000	0.0000			0.0000	0.0000			0.0000





Determining 2014 Toxics Reporting Requirements





Spreadsheets for g(2) exempt combustion sources

Mecklenburg County, NC > LUESA > Air Quality > Permitting Regulations > Emission Calculation Spreadsheets

[Air Quality Home](#)
[AQC](#)
[AQ Data](#)
[Community Info](#)
[e-Pay AQ Fees](#)
[Facility Database](#)
[Motor Vehicles](#)
[Regulated Industry](#)

Address
Office Location:
Hal Marshall Services Center
700 N. Tryon Street
Charlotte, NC 28202
Hours: Mon-Fri 8 a.m - 5 p.m.

Contact
Shelley Lanham
704-336-5430
Send an Email

Emission Calculation Spreadsheets

The following files are excel spreadsheets for use in determining site emissions. Click on the links below to download the Excel files to your computer. If you experience difficulties with these spreadsheets, please e-mail **Aaron Matijow**.

Please submit the electronic version on disk as well as the paper version when making your emission calculation submittal to your MCAQ contact. If you would like to e-mail the electronic version directly to your MCAQ contact, please call them at 336-5430 to coordinate such action.

Coal Combustion	Rev 02/2013
Concrete Batch Plants	Rev 12/2014
Crematory Incinerators	Rev 08/2009
Fuel Oil Combustion	Rev 11/2012
Dual Fuel and Large Diesel Engines	
Instruction Document (NEW!)	Rev 01/2012
Gasoline and Small Diesel Engines	Rev 01/2012
Liquefied Petroleum Gas (LPG) Combustion	Rev 02/2010
Medical Waste Incineration	Rev 05/2010
Natural Gas Combustion	Rev 10/2013
Stone/Rock/Slag Quarry Operations	REV 05/2011
Wood Combustion	Rev 07/2011
Wood Working Operations	Rev 07/2007
Hot Mix Asphalt	Rev 10/2005
Gasoline Terminals	Rev 05/2011
Stage I Gasoline Dispensing	Rev 05/2013

These spreadsheets use emission factors from the latest version of EPA's AP-42 Volume 1 for Stationary Sources. Emission test results may provide more accurate emission estimates and should be considered for use.

<http://airquality.charmeck.org>



I GET IT!
I FINALLY GET IT !!

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